AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method comprising:

receiving an allocate request from a queue pair;

finding a free buffer <u>associated with an entry</u> in a free pool;

determining whether a number of buffers allocatable to the queue pair is greater than zero;

deciding whether a number of buffers allocated to an operation type is less than a maximum<u>;</u><s>maximum; and</s>

allocating the free buffer to the queue pair if the queue pair requests the free buffer for an operation having the operation type <s>and the determining and the deciding are true,</s> <u>the number of buffers allocatable to the queue pair is greater than zero, and the number of buffers allocated to the operation type is less than a maximum, wherein the allocating further comprises setting an identifier of the queue pair into the entry in the free pool and setting status in the entry in the free pool, wherein the setting the status in the entry in the free pool further comprises setting a use of the free buffer in the entry;</u>

<u>receiving a validate request and a provided queue pair identifier from a direct memory access engine, wherein the validate request is associated with a data transfer that uses the free buffer;</u>

<u>in response to the receiving the validate request from the direct memory access engine, determining whether the provided queue pair identifier matches the queue pair identifier in the entry in the free pool, determining whether a requester of the data transfer matches the identifier of the queue pair in the entry in the free pool, and determining whether provided status provided by the requestor matches the status in the entry in the free pool;</u>

<u>if the provided queue pair identifier matches the queue pair identifier in the entry in the free pool, the requester of the data transfer matches the identifier of the queue pair in the entry in the free pool, and the provided status provided by the requestor matches the status in the entry in the free pool, returning an indication of a successful validation;</u>

<u>if the provided queue pair identifier does not match the queue pair identifier in the entry in the free pool, returning an error to the direct memory access engine;</u>

Docket No. ROC920030232US1
Serial No. 10/688,220

if the requester of the data transfer does not match the identifier of the queue pair in the entry in the free pool, returning the error to the direct memory access engine; and

if the provided status provided by the requestor does not match the status in the entry in the free pool, returning the error to the direct memory access engine.

2. (Currently amended) The method of claim 1, wherein the use comprises an indication of whether the free buffer is to be used for a master operation and an indication of whether the free buffer is to be used for a target operation.further comprising:

~~receiving a validate request associated with a data transfer that uses the free buffer.~~

3. (Currently amended) The method of ~~claim 2,~~claim 1, wherein the use comprises an indication of whether the free buffer is to be used for a read operation and an indication of whether the free buffer is to be used for a write operation. ~~further comprising:~~

~~determining whether a requester of the data transfer matches the queue pair.~~

4. (Currently amended) The method of ~~claim 2, further comprising:~~claim 1, wherein the use comprises an indication of whether the free buffer is to be used for an RDMA operation and an indication of whether the free buffer is to be used for a send operation.~~determining whether a type of the data transfer is valid for the operation type.~~

5. (Currently amended) The method of claim 1, wherein the determining whether the number of buffers allocatable to the queue pair is greater than zero further comprises:

determining whether the number of buffers allocatable to the queue pair is greater than a remaining size of the operation.

6. (Original) The method of claim 1, wherein the operation type is a transmit.

7. (Original) The method of claim 1, wherein the operation type is a receive.

3   Docket No. ROC920030232US1
                                  Serial No. 10/688,220

8. (Currently amended) An apparatus comprising:

means for receiving an allocate request from a queue pair;

means for finding a free buffer associated with an entry in a free pool;

means for determining whether a number of buffers allocatable to the queue pair is greater than zero;

means for deciding whether a number of buffers allocated to an operation type is less than a maximum;maximum; and

means for allocating the free buffer to the queue pair if the queue pair requests the free buffer for an operation having the operation type, the number of buffers allocatable to the queue pair is greater than zero, and the number of buffers allocated to the operation type is less than a maximum, wherein the means for allocating further comprises setting an identifier of the queue pair into the entry in the free pool and setting status in the entry in the free pool, wherein the setting the status in the entry in the free pool further comprises setting a use of the free buffer in the entry;

means for receiving a validate request and a provided queue pair identifier from a direct memory access engine, wherein the validate request is associated with a data transfer that uses the free buffer;

means for determining whether the provided queue pair identifier matches the queue pair identifier in the entry in the free pool, determining whether a requester of the data transfer matches the identifier of the queue pair in the entry in the free pool, and determining whether provided status provided by the requestor matches the status in the entry in the free pool, in response to the means for receiving the validate request from the direct memory access engine;

means for returning an indication of a successful validation if the provided queue pair identifier matches the queue pair identifier in the entry in the free pool, the requester of the data transfer matches the identifier of the queue pair in the entry in the free pool, and the provided status provided by the requestor matches the status in the entry in the free pool;

means for returning an error to the direct memory access engine if the provided queue pair identifier does not match the queue pair identifier in the entry in the free pool;

Docket No. ROC920030232US1
Serial No. 10/688,220

means for returning the error to the direct memory access engine if the requester of the data transfer does not match the identifier of the queue pair in the entry in the free pool; and

means for returning the error to the direct memory access engine if the provided status provided by the requestor does not match the status in the entry in the free pool. ~~and the means for determining and the means for deciding are true; and~~

~~means for receiving a validate request associated with a data transfer that uses the free buffer.~~

9. (Currently amended) The apparatus of claim 8, wherein the use comprises an indication of whether the free buffer is to be used for a master operation and an indication of whether the free buffer is to be used for a target operation. ~~further comprising:~~

~~means for determining whether a requester of the data transfer matches the queue pair.~~

10. (Currently amended) The apparatus of claim 8, wherein the use comprises an indication of whether the free buffer is to be used for a read operation and an indication of whether the free buffer is to be used for a write operation. ~~further comprising:~~

~~means for determining whether a type of the data transfer is valid for the operation type.~~

11. (Currently amended) The apparatus of claim 8, wherein the means for determining whether the number of buffers allocatable to the queue pair is greater than zero further comprises:

means for determining whether the number of buffers allocatable to the queue pair ~~a queue pair~~ is greater than a remaining size of the operation.

12. (Original) The apparatus of claim 8, wherein the operation type is a transmit.

13. (Original) The apparatus of claim 8, wherein the operation type is a receive.

Docket No. ROC920030232US1
Serial No. 10/688,220

14. (Currently amended) The apparatus of claim 8, further comprising:

     means for deallocating the free buffer if the requestor~~a requestor~~ matches the queue pair.

15. (Currently amended) An adapter comprising:

     a free pool of a plurality of entries; and

     a controller that

          receives a plurality of allocate requests from a plurality of queue pairs, finds a plurality of free buffers in the free pool,

          determines whether a number of buffers allocatable to the plurality of queue pairs is greater than zero,

          decides whether a number of buffers allocated to an operation type is less than a maximum,

          allocates the plurality of free buffers to the plurality of queue pairs if the plurality of queue pairs request the plurality of free buffers for an operation having the operation type, the number of buffers allocatable to the plurality of queue pairs is greater than zero, and the number of buffers allocated to the operation type is less than a maximum, sets an identifier of the plurality of queue pairs into the plurality of entries in the free pool, and sets status in the plurality of entries in the free pool, wherein the set of the status in the plurality of entries in the free pool further sets a use of the plurality of free buffers in the plurality of entries,

          receives a validate request and a provided queue pair identifier from a direct memory access engine, wherein the validate request is associated with a data transfer that uses one of the plurality of free buffers,

          determines whether the provided queue pair identifier matches the queue pair identifier in one of the plurality of entries in the free pool, determines whether a requester of the data transfer matches the identifier of one of the plurality of queue pairs in the one of the plurality of entries in the free pool, and

Docket No. ROC920030232US1
Serial No. 10/688,220

determines whether provided status provided by the requestor matches the status in the one of the plurality of entries in the free pool, in response to the receive of the validate request from the direct memory access engine,

returns an indication of a successful validation if the provided queue pair identifier matches the queue pair identifier in the one of the plurality of entries in the free pool, the requester of the data transfer matches the identifier of the one of the plurality of queue pairs in the one of the plurality of entries in the free pool, and the provided status provided by the requestor matches the status in the one of the plurality of entries in the free pool,

returns an error to the direct memory access engine if the provided queue pair identifier does not match the queue pair identifier in the one of the plurality of entries in the free pool,

returns the error to the direct memory access engine if the requester of the data transfer does not match the identifier of the one of the plurality of queue pairs in the one of the plurality of entries in the free pool, and

returns the error to the direct memory access engine if the provided status provided by the requestor does not match the status in the one of the plurality of entries in the free pool. ~~allocates the plurality of free buffers from the plurality of entries in response to the plurality of allocate requests from the plurality of queue pairs if a number of buffers allocatable to the plurality of queue pairs is greater than zero, if a number of buffers allocated to an operation type is less than a maximum, and if the plurality of queue pairs request the plurality of free buffers for operations having the operation type, validates the plurality of free buffers for a plurality of data transfers, and deallocates at least one of the plurality of free buffers in response to a shutdown of an associated at least one of the plurality of queue pairs.~~

16. (Currently amended) The adapter of claim 15, wherein the use comprises~~controller further stores status in each of the plurality of entries, wherein the status comprises~~ an

indication of whether each of the respective plurality of free buffers is to be used for a master or a target operation.

17. (Currently amended) The adapter of claim 15, wherein the use comprises~~controller further stores status in each of the plurality of entries, wherein the status comprises~~ an indication of whether each of the respective plurality of free buffers is to be used for a RDMA or a send operation.

18. (Currently amended) The adapter of claim 15, wherein the use comprises~~controller further stores status in each of the plurality of entries, wherein the status comprises~~ an indication of whether each of the respective plurality of free buffers is to be used for a read or a write operation.

19. (Canceled)

20. (Canceled)

Docket No. ROC920030232US1
                Serial No. 10/688,220